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Please find enclosed some comments on the annex to chapter 6, dealing with issues concerning the recordings in relation to storage.

Best regards

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Annex to chapter 6: separating storage production from holding gains and losses

A. Introduction

This annex is welcome, particularly because it includes practical examples that illustrate a delicate issue. It is all the more useful that the SNA08 chapter 6 has considerably reduced the importance of work-in-progress in the presentation of the recording of the production process, giving finally the impression to underestimate the role of inventories, especially inventories of work-in-progress.

Two main issues are addressed in this comment:

- the recommendation consisting in estimating the output due to storage on the basis of expected real holding gains, first because this recommendation is wrong, and also because it does not follow from the developments that underlie it;
- the storage as an activity, on which there seems to be a misunderstanding in the annex: contrary to the statement made in § 6A.19, the output that is due to storage is not always to be attributed to the activity of storage, but in most cases it has to be attributed to the activity producing the goods that are stored; in addition, the recording should be specified in detail.

Other issues are also dealt with, and a detailed comment of paragraphs is undertaken.

It is necessary:

- to amend the text in order to amend the mistakes that are included in the present annex;
- to reword the content of §§ 6A.9-6A.14, and to reword “Who produces storage ?”
- to work out the numerical examples, that appear more or less as anecdotes, in order to transform them into actual pedagogical tools;
- to treat in full the case of production taking a long time to be completed, the importance of which has also been considerably reduced in chapter 6, particularly through the deletion of the paragraphs dealing with agriculture, forestry and fishing that, in SNA93, make up a useful practical illustration of this issue;
- to improve the terminological precision.

Of course, this should lead to make the corresponding amendments to chapter 6, particularly with regard to the recommendation made in § 6.144.

B. Terminological issues

Value, price and holding gain

Most of the time, there is no ambiguity and the terms “value” and “price” may be used equally to name things, flows and stocks as well. However, when it is precisely the case to analyse a change in value of a flow for deciding whether it finds its origin in a price effect or in a volume effect, care should be taken to

specify “value” instead of “price” to refer to the value, precisely. For instance, in § 6A.9, such a precaution should be taken.

Example of right use of “value”: § 6A.1, 6A.15

Example of inappropriate use of “price”: § 6A.10

From an analytical point of view, it is also necessary to separate carefully when “change in price” and “holding gain”, respectively, have to be used. For instance, when in § 6A.9, it is referred to “the increase in the price of the new product made last year to the price of a similar new product made this year”, this increase is a change in price, because it refers to a flow, and not a holding gain as indicated later in the same sentence. It is only when the relating price index is applied to a stock that a holding gain is identified.

The use of the term “real” should be carefully addressed. Inappropriate uses of “real” are found: in the title of section B, in § 6A.12 (real terms) where it is difficult to be interpreted, in § 6A.12 (real price, which is strange).

The use of the word “costs” : §§ 6A.2, 6A.3

In the two paragraphs, the word “costs” is used both to refer to production costs, but also to the value of the goods bought for resale. In the trade industry, as pictured in national accounts, the value of the goods for resale is not part of the production costs.

For instance, § 6A.3 in a sentence that creates ambiguity:

“Because all the costs associated with storage are included in production costs, the value of the goods as they enter and leave inventories are valued at the costs of producing or acquiring replacement items.”

One may wonder why the sentence begins by “because”, since there is no - or there should not be - no causal relationship between the two sentences.

It is true that business accounting uses the word “cost” to refer to the value at which inventories are acquired. See, for instance: *IAS 2 - Inventories*, that deals with cost of inventory (costs of purchase, for instance).

However, it is not usual in national accounts, that do not use the word “costs” in this context, and use rather the word “price”. For instance § 6.143 defines the trade margin as follows:

“A trade margin is defined as the difference between the actual or imputed price realized on a good purchased for resale and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of.”

Other case of inappropriate use of “cost”: § 6A.8 (cost of the new entry).

Other terminological issues

It would be better to refer to the physical qualities of goods than simply to characteristics. Quality echoes to issues dealing with the volume/price breakdown and implies the notion of output. If only characteristics changed without the quality being improved, it is likely that there would be no output.

C. The specific case of goods whose physical characteristics change

What is surprising in section 2 is that, while the conclusions drawn in § 6A.10 are perfectly right, the recommendation that follows in § 6A.12 seems to be completely wrong¹.

An apparent contradiction

What is at stake ?

- § 6A.10 recommends to eliminate nominal holding gains from the change in value of a stored good between two points in time, the remaining part of the value being due to output; this is done using adequate price indices.
- § 6A.12 recommends, in a context of reduced information, to estimate output by the expected real holding gain.

It is actually not understandable why, because of a lack of data, it is necessary to use a method that is in such a contradiction with the right method that has to be used in a context of perfect information. When nominal holdings are eliminated in the right method, real holding gains are also eliminated: by which miracle would they become the right measure in another context ? the shift from actual flows to expected flows cannot be so miraculous.

Output consists precisely in something which is not a holding gain, or included in a holding gain.

In fact the recommendation made in § 6A.12 is wrongly labelled

It is not so obvious to understand the real content of the recommendation made in § 6A.12. It has to be said that the paragraph is badly worded, using an imprecise terminology: the expression “real terms” in particular is unclear.

After a long study, and under some assumptions about the meaning of the paragraph, it seems that the recommendation made in § 6A.12 is a second best method, that may be used when no specific deflator for the good under study is available. Instead of using such specific deflators, the values of the goods are deflated by a general price index. While the complete method consists in subtracting from the values at current prices the total nominal holding gains, the recommendation results in subtracting only the neutral holding gains.

The concern is that, when neutral holding gains are subtracted, what remains does not consist only in real holding gains, but includes also the result of transactions. This may be evidenced by a simple example, where a transaction increases the stock of an existing asset at the very beginning of the period:

opening stock of an asset	OS	1,000
transaction leading to an entry in the stock of the asset	T	100
specific price increase of the asset (index)	Ip	1.10
closing stock of the asset	CS	1,210
general price index	Ig	1.04
nominal holding gain		110
neutral holding gain		44
real holding gain		66

1. It is not impossible that, despite the time the author of the present note has spent on this annex, he - since the author is a “he” - has not understood at all the proposal. In which case, as he thinks that he is not completely unaware of these kinds of issues, there is probably a problem of exposition and wording of the recommendation.

The following results are obtained

- when the value of the closing stock is deflated by the specific price index, the result is logically equal to:

$$\text{value of the opening stock} + \text{value of the transaction}$$

- so that:

$$\frac{CS}{Ip} - OS = T = \text{value of the transaction}$$

in fact, dividing the value of the closing stock by the specific price index eliminates the nominal holding gains.

- it can be shown that:

$$\frac{CS}{Ig} - OS = T + \frac{\text{real holding gain}}{Ig} \approx \text{value of the transaction} + \text{real holding gain}$$

thus the difference between the value of the opening stock, on the one hand, and the value of the closing stock divided by the general price index, on the other hand, is equal, more or less, to the sum of the value of the transaction and of the real holding gain.

Conclusion: contrary to what is implied in § 6A.12, when the future values of the goods are deflated by a general price index, the result is not the real holding gain. The result is the sum of the output and of an amount which is close to the real holding gain.

Rewording the recommendation

The recommendation has actually the aim to estimate the output, and it results in something which is close to the target, but that is not a real holding gain.

The recommendation may be redrafted as follows. When full information is not available, the output may be estimated by deflating the current values of the good by a general price index. The result will be all the more precise that the specific prices movements are close to the general prices movements.

However, this is tautological.

Rewording the whole

In fact, it is necessary to explain in-depth the treatment that should be applied in the context of a good information, together with the rationale of the treatment. This may be done by rewording § 6A.9, in order to make it more accessible to the reader: splitting the paragraph and blowing air inside it would thus be welcome.

Once the right treatment is clearly exposed, people are usually able to adapt it to the specific information they face in practice. However, if felt useful, a simplified method may be suggested. The concern is that the present text of the Annex is not clear about its recommendation. In fact, instead of the use of the general price index as said above, it seems that the suggestion relies rather on the availability of "expert guess" type information.

Therefore, this should be made completely explicit. There is no difference in method: the right method, as the one that prevails in a context of perfect information, is simply to be used in a context of poor information. However, the aim is the same: eliminating holding gains. The conditions of the use of the second best information - such as the use of a production schedule in constant prices - should be specified. There seems to be no necessity to start by eliminating neutral holding gains.

§ 6A.13 should be reworded consistently. What has to be eliminated finally is the presence of nominal holding gains.

§ 6A.14 should be deleted.

All these issues are re-examined on the basis of a numerical example.

Taking a numerical example to illustrate § 6A.9

§ 6A.9 referring to a practical case, it is possible to go a bit further and to illustrate the treatment exposed there by showing a very simplified numerical example that, in addition, may be re-used in the context of § 6A.12. The clarity may also be improved by the use of a simple algebraic notation.

1. An algebraic notation

The case in § 6A.9 refers to a good the value of which has two dimensions: a date and a maturity, which in other contexts is referred to as an age. At one point in time, i.e. at a date, there are 4 categories of the good that are distinguished by their respective maturities: 0-year, 1-year, 2-year and 3-year.

This leads naturally to refer to the value of a good of maturity m at date t by:

$$value(date\ t, maturity\ m)$$

2. The implicit assumption underlying the treatment of the case

The main assumption on which is based the treatment of the case is that there is no difference in quality that is not explained by maturity. Therefore, when comparing the values of two products of the same maturity at two different dates, all the difference is due to changes in prices. For instance, the difference between the respective unit values: $value(t, 2)$ and $value(t + T, 2)$ is fully a change in prices.

In reality, specifically in the case of wine, it may happen that consumers attribute to two different vintages of the same good some difference in quality, even for the same maturity. The difference in their respective unit values is thus not simply a price effect. In this case, the application of the treatment is more difficult, since it is necessary to disentangle the price effect and the quality (volume) effect in the change in value of the product.

3. What is observed

In § 6A.9, it is assumed that the good is traded at each maturity, so that observable prices exist for each maturity at all dates. For instance, there exist at date t four observable prices: $price(t, 0)$, $price(t, 1)$, $price(t, 2)$, $price(t, 3)$.

For the purpose of the illustration, it is possible to take the example of the following prices:

$price(0, 0)$ which corresponds to a newly manufactured good at date 0

$price(1, 1)$ which corresponds to a good reaching one year of maturity at date 1, i.e. the previous good one year later

$price(1, 0)$ which corresponds to a newly manufactured good at date 1

It is useful to calculate the following index: $I_{price(1,0)} = \frac{price(1,0)}{price(0,0)}$, which relates to two goods that are considered to be identical, since they have the same maturity, at two following dates.

4. An example

Now, we want to analyse the change in the value of one good between 0 and 1. In this case, even if it seems a bit artificial, it is analytically better to refer to values rather than to prices, since we follow the successive values taken by the same good.

Two successive values are observed for this good:

$value(0, 0)$ the value which corresponds to the newly manufactured good at date 0

$value(1, 1)$ the value of the same good one year later

It is useful to introduce the following intermediate calculation:

$value(1,0)$ that is obtained by applying to $value(0,0)$ the change in prices as measured by the price index $I_{price}(1,0)$

It is important to note that, despite the appearances, this value is not observed.

In the context of this simplified example and given the assumption that underlies it, it is true that $value(1,0) = price(1,0)$, so that $value(1,0)$ is de facto observed. However, in actual cases, indices such as the price index as calculated above may not be so easy to find. It may be necessary to build such indices, simply because observed prices are not enough available by maturity.

5. Analysis of the change in value

In absence of a general context of changes in prices, when the quality of a good increases while being stored, its production is deemed to continue so that the increase in value must be treated as additional output. However, when the prices are also increasing, which may be measured by the change in unit values observed for identical qualities of the same good at different points in time, it is necessary to separate the two effects.

To summarise, in the case under review, the change in the value of the good stems from two factors:

- a change in the price of the good, that is likely to affect all the maturities (even if not by the same rate), and that would occur in absence of any maturation effect
- a change due to maturation

As the production process takes several periods, during which the good remains in inventories, the price effect leads to the appearance of holding gains. With the help of the intermediate calculation, the difference between the successive values of the good may be broken down into two components:

$$\begin{aligned} \text{change in the value of the good} &= value(1,1) - value(0,0) \\ &= [value(1,1) - value(1,0)] + [value(1,0) - value(0,0)] \end{aligned}$$

$[value(1,0) - value(0,0)]$ is the difference between the value of a 0-year maturity good at date 1 and the value of a 0-year maturity good at date 0; it is a holding gain that affects the good because it remains in inventories during the period that spans from date 0 to date 1

$[value(1,1) - value(1,0)]$ is the difference between the value of a 1-year maturity good at date 1 and the value of a 0-year maturity good at date 1; it stems from the output due to maturation during the storage

Notes: the identification of the holding gain is possible only because it is assumed that the same price increase that occurs between two manufactured goods applies also to the good that remains in inventories; this assumption is possible because all changes in quality are deemed to refer to maturation; this is exactly what is explained in § 6A.10;

as it will be seen in the numerical illustration, the second difference above is due to output; however, it does not measure the output, since the output being produced continuously and stored, it is also subject to holding gains when in inventories;

the output may itself be broken down between a change in volume and a price increase; if prices are assumed to increase regularly, the average change in price is equal to the change in prices between two dates; therefore, the same price index as calculated above may be used in order to separate volume and prices for output.

6. Numerical illustration

The following prices are observed:

$price(0,0)$	100
$price(1,0)$	112
$price(1,1)$	168

In addition, the general price index shows a change of 4 % between dates 0 and 1.

While the shift from prices to values is straightforward and has no real usefulness in this example, it is nevertheless used in order to keep continuity.

The following results are obtained:

$$[\textit{value}(1,0) - \textit{value}(0,0)] = 112 - 100 = 12 \quad \text{nominal holding gain on opening stock}$$

$$[\textit{value}(1,1) - \textit{value}(1,0)] = 168 - 112 = 56 \quad \text{increase due to output}$$

Further calculations:

- the increase due to output may be further broken down between the value of the output itself and a holding gain that accrues because the output, being produced continuously, remains in average in inventories half of the year;
- the holding gain relating to the output entered in inventories is estimated to be at 3; it follows that the value of output is equal to 53;
- the total nominal holding gains amount therefore to 15: they may be broken down between a neutral holding gain amounting to 5, and a real holding gain of 10;
- the value of the output may be further broken down into a volume effect and a price effect: this is made in terms of average prices of the respective years; this is not shown here, since not directly useful;

7. Extrapolation of the example

The example may be extrapolated for the two following periods by making the following assumptions:

- the output does not change in constant prices, its value changing only due to the effect of changes in prices;
- the price increase of the good is the same in year 2 and in year 3, and is equal to 12 %;
- the general prices increase each year by 4 %

The method used is the same as above, consisting in breaking down the change in the value of a good during one year in two components, by using the following formula:

$$\textit{value}(t+1, t+1) - \textit{value}(t, t) = [\textit{value}(t+1, t+1) - \textit{value}(t+1, t)] + [\textit{value}(t+1, t) - \textit{value}(t, t)]$$

The following table summarises the results:

Table 1: initial and final values at current prices

initial value current prices	nominal holding gain on the initial stock	output current prices	nominal holding gain on the output in inventories	final value current prices
<i>value</i> (0,0) 100	12	53	3	168 <i>value</i> (1,1)
<i>value</i> (1,1) 168	20	58	4	250 <i>value</i> (2,2)
<i>value</i> (2,2) 250	30	66	4	350 <i>value</i> (3,3)

Of course, other assumptions may be made about the pattern of the additional outputs that are liable to occur: it is possible to assume that most of the additional output occur during the first year, or any other pattern. The issue is similar to cases encountered with capital services and CFC.

The holding gains are the following ones:

Table 2: details of holding gains

year	nominal holding gains			neutral holding gains			real holding gains		
	on initial stock	on output	total	on initial stock	on output	total	on initial stock	on output	total
1	12	3	15	4	1	5	8	2	10
2	20	4	24	7	1	8	13	3	16
3	30	4	34	10	1	11	20	3	23

The recommendation stated in § 6A.12

This recommendation is wrong or wrongly stated

The recommendation is stated in the last sentence of the paragraph:

“This leads to the recommendation that [...] storage may be estimated as the expected real holding gain over a given period.”

This recommendation is doubly strange:

- it does not follow at all the conclusions of §§ 6A.9-6A.10
- the method used does not actually rely on expectation

The recommendation stated in § 6A.12 does not follow the conclusions drawn in §§ 6A.9-6A.10

§§ 6A.9-6A.10 explain in-depth how to eliminate nominal holding gains, i.e. both neutral and real ones, from the values of a good in storage in order to get the only contribution of output to the change in value. Instead, § 6A.12 explains that the aim is to calculate output as a holding gain: the fact that this holding gain is real and expected does not change the fact that it is precisely the contrary that has to be made.

Let go in the detail of this paragraph that is not easy to understand, being not well worded. The main sentence seems to be the penultimate sentence:

“Further, the expectation of the price increase from 100 to 250 is in real terms, and takes no account of the general rate of inflation.”

Why is this sentence here only, whilst it should be at the very beginning, being an assumption ? Why “further” ?

What does mean “real terms” here ? Is the mention that no account is taken of the general rate of inflation an additional information, or is it a precision about the meaning of “real terms” ?

1st assumption: “real terms” means in prices of date 0

In the following, it is assumed that “real terms” means in constant prices of date 0. In other words, when, at date 0, a new produced good has a value of 100, the producer expects, on the basis of experience, that the value of the same good, when it is 3-year mature, will be 250 in prices of 0.

The situation that is described here is exactly the one that is shown in the above Table 1. Starting from an initial value of 100, the final values at constant prices, expressed in the prices of date 0, of Table 1 are the following ones:

	final value	current prices	prices of date 0
<i>value</i> (1,1)		168	150
<i>value</i> (2,2)		250	200
<i>value</i> (3,3)		350	250

These values are obtained by dividing the final values at current prices by the successive price indices of the good - that are compounded in years 2 and 3.

However, in order to obtain those successive amounts of 150, 200 and 300, not only the nominal holding gains have been eliminated, but also the increases in prices of the successive outputs that are thus expressed also in constant prices of date 0. This may be shown in the following table:

Table 3: from current prices to constant prices

year	nominal holding gain of the period (1)	increase of output due to prices (2)	Total (1) + (2)	cumulated total (4)	final value of the good at current prices (5)	final value of the good at prices of date 0 (5) – (4)
1	15	3	18	18	168	150
2	24	8	32	50	250	200
3	34	16	50	100	350	250

This leads to the estimate of the output in the next three years being equal to 50 at constant prices, which leads to the output at current prices that are shown in the above Table 1: 53, 59, 66, under the assumptions made about the price increases of the good.

2nd assumption: “real terms” means deflated by a general price index

Using the data from the numerical example, the method consists in calculating the value of the goods at constant prices, by dividing their values by the general prices index, defined above as equal to 4 %.

Table 4: Calculation of deflated values

year	value of the goods at current prices initial value	deflated value of the goods initial value	value of the goods at current prices final value	deflated value of the goods final value	difference between deflated values
1	100	100	168	162	62
2	168	162	250	231	69
3	250	231	350	311	80

The differences that are shown in the last column are the estimates of the respective outputs at constant prices of date 0. By difference with the example where the deflation is made by use of specific prices, these values are logically higher, since they include an approximate of the real holding gains. The existence of the latter is evidenced by the difference between the specific prices index and the general price index.

The values obtained have to be “reinflated” by the general price index, with an assumption that the output is produced in the middle of the period.

It is unlikely that this kind of information be used to calculate expected outputs

It is certain that national accountants are able to collect the type of information indicated in § 6A.12. By “experts guess”, they know that, at constant prices, the value of a product is changing from 100 at the beginning of maturation to reach 250 at the end of maturation.

However, from this information, it is unlikely that they will use it to estimate output of future periods. They probably know the quantities of products in storage at one point in time with some distribution by vintage. In which case, they are able to value the stock, and to distribute accordingly the output by means of the above information.

D. What is the output that results from storage ?

§ 6A.19 states that “type II products give rise to production of storage”, which is not usually right, while § 6A.1 refers only to “the increase in value held in inventories [that] may be regarded as production due to storage”. This last formulation is more careful and relevant.

What is general is the fact that, according to SNA93 § 6.65, “the storage services become incorporated in the goods, thereby increasing their value while being held in store”. The issue is: how does this incorporation occur ? From this point of view, a distinction has to be made depending of the type of product and the origin of the increase in output during storage:

- for the first two categories of goods of type II - goods with a long production process, goods the quality of which changes during storage - the goods are transformed during storage: storage is thus part of the production process of the involved goods, the output is produced by the producer of the goods;
- for goods of the third type - goods that have a seasonal pattern of supply or demand -, there is no transformation of the good during storage; in this case, the output recorded during storage may be an output of storage, understood as a separate activity.

This leads to distinguish two cases, to which correspond two different modalities of recordings.

This should lead to redraft § 6A.20.

First case: the output due to storage is recorded as produced by the producer of the good

There is no problem for the recordings of the changes in the value that affect the goods that have a long production process. Involved activities belong mainly to agriculture, manufacturing - Manufacture of machinery and equipment, e.g. - and construction. There is no ambiguity about the fact that the output is recorded as an output of the good that is produced, and recorded under work-in-progress. In fact, this case is not really referred to a case of storage.

For goods the physical qualities of which change while in inventories, things are similar, although this is less obvious. It is worth taking the case of wine.

The case of maturation of wine: classification issues

In ISIC Rev 3.1, the production of wine belongs either to agriculture or to the food industry:

- 0113 *Manufacture of wines from self-produced grapes*
- 1552 *Manufacture of wines from grapes not grown by the same unit*

The product belongs to *CPC 242 Wines*.

The maturation of wine is most often, if not always, the work of the producers of the wine, and it takes place in specialised premises. This activity is not subcontracted to professionals of storage.

In this case, storage is fully part of the activity of producing wine, it is not a separate activity.

The case of maturation of wine: recordings

The recordings that are made in this case are classical of the work-in-progress. There is no specific output of storage, the output that occurs during the maturation process is an output of the product *Wine*, and is carried out by the corresponding good-producing industries.

The costs that are incurred for storing the wine during maturation, are not separated from the whole costs incurred by the producer of the wine.

The numerical example that has been developed in section C may be used to illustrate the recordings relating to the complete cycle of the production of wine, in the goods and services account, specifically in

the balance of the Wine product. The recordings relating to balance sheets and their changes are also shown.

Table 5: recordings relating to wine during maturation

year	0	1	2	3	4
Resources					
output	100	53	58	66	
Uses					
additions to inventories of work-in-progress	+ 100	+ 53	+ 58	+ 66	
withdrawals from inventories of work-in-progress					- 350
other uses					350
Opening stock of inventories	0	100	168	250	350
changes in inventories	+ 100	+ 53	+ 58	+ 66	- 350
nominal holding gains	0	15	24	34	0
Closing stock of inventories	100	168	250	350	0

Second case: the output due to storage is recorded as produced in the context of a storage activity

For goods the change in the value of which is not due to the physical transformation of the product, but that have specific seasonal patterns, it is the storage itself - as a time transportation activity - that is at the origin of the change in value. It may be the case that the increase in value is captured by the producer of the good, as for the case of maize, in which case there is no separate storage activity and the recordings are the same as in the case of wine.

However, the storage may alternatively be carried out by enterprises that are specialised in storage, including for maize. In this case, the recordings are very specific.

Storage and storage services in classifications

In ISIC Rev.4, Storage belongs to:

Section H - Transports and storage

Division 52 - Warehousing and support activities for transportation

Group 521 - Warehousing and storage

These activities deliver *Storage and warehousing services*, which constitute the Group 672 of CPC ver.2. The distinctions among the services of the Group rely on the technical aspects of storage: silos, refrigerated or non refrigerated warehouses, tanks, etc.

The content of storage activity

Storage is "an important process of production in its own right whereby goods are "transported" from one point of time to another", and "storage can be viewed as transportation over time rather than space".

SNA93 § 6.104 provides an interesting indication about the volume dimension of storage activity, that gives some insights on the content of the activity itself:

"The volume of storage services produced can be measured by indicators such as space-days which combine the volume of storage space provided with the length of time over which the goods are stored, taking account of other relevant factors such as the environment in which the goods are stored which affect the quality of service provided".

Recordings to be made

The recordings should be the same whether the storage is undertaken by a trader or by an enterprise specialised in storage that is paid for separately. As for transport, the output of this activity may be recorded under the form of margins, when separately invoiced. For transportation, everything else being equal, the output, and thus the margins, is all the more large that the distances between the producer of the transported good and the consumers/acquirers of the goods are long.

Similar considerations are relevant for storage. The output of the producer of storage is all the more important that the time of storage is long; or, in the case under review, the output increases with the value of the stored product, the output being attributed to storage. When acquired by the producer of storage, the goods enter the stocks of inventories of the latter. They belong to the category of goods for resale.

Illustrative example:

Taking the example of maize:

- a crop of maize is produced and sold to an enterprise specialised in storage, for a value of 100
- during the same period, the value of maize increases while being stored: the final value is estimated to be 150
- in the following period, the value of the stored maize continues to increase, in such a way that the totality of the crop is sold to users for the value of 180

The recordings are made in the balance of the product: *Maize*.

Table 6: recordings relating to maize with seasonal patterns

period	0	1
Resources		
output of maize	100	0
storage margins	50	30
Uses		
additions to inventories of goods for resale	+ 150	+ 30
withdrawals from inventories of goods for resale		- 180
other uses		180
Opening stock of inventories	0	150
changes in inventories	+ 150	- 150
nominal holding gains	0	0
Closing stock of inventories	150	0

If the storage is undertaken by an enterprise belonging to the trade industries, the recordings are the same.

It is not frequent that this treatment is actually applied in practice.

E. Review of cases

The example treated in § 6A.4

In general, the example should be more worked out, with the numerical illustration completed through conclusion.

Preliminary advice: it is better to take figures such as 1,000 units/packets for purchases and sales, and thus 100 units for inventories, which would lead to integer figures for values, instead of decimal ones, that are not always easy to manipulate.

Wording issue for cost and price

In the 2nd sentence, it is referred to the “cost per packet is 1”:

- it is true that, in business accounting, reference is often made to the “purchasing costs of goods for resale”; however, in business accounting, production is not a relevant concept, only sales or turnover are relevant. In national accounts, the output of traders being measured by a margin, the acquisition of goods for resale is never shown as a cost, only intermediate inputs and the use of factors of production constituting costs;
- it is therefore better to avoid costs in this sense; it is better to use something as acquisition price, purchase price, or to specify acquisition cost to avoid ambiguity.

In the 3rd sentence, it is said that “the price increases to 1.05”:

- first, this price was a cost in the previous sentence
- then, even a simple example as this one, it is better to specify which price is concerned (see above)

Presentation of the example: although the result is right, the reasoning used in the text is not so obvious.

1. It is necessary to specify a bit the example.

A careful reader has taken note that the case refers to a trader - a wholesaler -, and that it is the acquisition price that shifts from 1.00 to 1.05. Therefore, he may be surprised to read that the “10 packets can now be sold for 10.5”, because his first thought is that the packets can be sold at selling prices, not at acquisition prices, and he has no information on the movements that may have affected the selling price.

2. It is necessary to specify the assumptions about the movements of prices (see below).

3. “Although these ten packets can be sold for 10.5 the increase of 0.5 is not production but simply a holding gain. When the wholesaler withdraws them for sale he must replace them with another 10 now costing 10.5. Thus the 0.5 increase is eliminated from measures of production ...”

These sentences are very elliptic and seem to contain a lot of understatements unattainable for the reader. Thus some questions:

- what is the relation between the fact that the packets can be sold for 10.5 and the fact that the increase could be production ? why “although” ? what about the 100 other packets ?
- what is the effect stemming from the fact that the wholesaler must replace the packets costing now 10.5 ? would the production/output be different if the wholesaler did not replace the 10 packets ?
- “Thus the increase ...”: why this thus ? to what extent the previous sentence has explained that the increase of 0.5 is eliminated from measures of production ?

It would be more convincing to recall the measure of the output of the trade activity, and the rules of valuation of purchases for resale, to make some assumptions about the timing of purchases and

sales, about the time of change of acquisition price, and to complete the numerical example through its conclusion.

Insofar as the only 10 packets in inventories are concerned, the statement of the right definition of changes in inventories as the difference between additions to inventories and withdrawals of inventories would be enough to check that the output is not altered, just when a change in prices modify the value of stocks of inventories. In absence of any sale or purchases, nor of any movements on inventories, there is absolutely no reason for output to change.

In fact, there seems to be an issue only when, instead of referring to the above-mentioned right definition of changes in inventories, use is made of an approximate measure relying on the availability of data on opening and closing stocks of inventories, in which case adjustments have to be borne to data². If this is what is understated, it should be made explicit.

3. “ .. the 0.5 increase appears only in the revaluation account explaining how the initial stock of 10 increases to 10.5 by the end of the period.”

This is true only if the changes in prices and the additions to / withdrawals from inventories are regular.

Taking an extreme example:

- the selling price is 1.50
- purchases are made the first day of the period, at an acquisition price of 1.00
- the acquisition price of goods for resale shifts to 1.05 just after the time the purchases have been made and before the time the sales have started

sales	100 x 1.50	150
purchases	100 x 1.00	100
additions to inventories	100 x 1.00	100
withdrawals from inventories	100 x 1.05	- 105
changes in inventories		- 5.0
opening stock	10 x 1.00	10.0
closing stock	10 x 1.05	10.5

It comes:

output	=	sales	150
		- purchases	100
		+ changes in inventories	- 5
	=		45

and:

	opening stock of inventories	10.0
+	changes in inventories	- 5.0
+	revaluation (holding gain)	+ 5.5
=	closing stock of inventories	10.5

It is possible to check the revaluation item: 10 packets from the opening stock and the 100 purchased packets have been revalued from 1.00 to 1.05.

Contrary to the example of § 6A.4, the holding gain amounts to 5.5, although the value of the closing stock is the same.

If, instead, it is assumed that purchases and sales are made on a regular basis, this is equivalent to the fact that all additions to and withdrawals from inventories are made at the middle of the period. If, in addition, assumption is made that the acquisition price increases regularly, all transactions are valued at the average price of 1.025. Therefore, the value of the changes in inventories, measured as additions minus withdrawals is zero.

2. It is true that all the text of the SNA93 dealing with the approximate measures of changes in inventories has been deleted from the SNA08 chapter 6.

Goods with a long production period

This example should be completely worked out here, instead of being postponed to an hypothetical chapter 20. It is not comfortable to have things scattered.

It would be better to recall the rules, and their rationale, of the allocation of the value of output all along the time of production, in relation with costs incurred. This is well done in SNA93, and illustrated by the case of agriculture, forestry and fishing (§§ 6.6-6.98). These paragraphs have unfortunately disappeared from SNA08. With such an introduction, the use of a discount factor, that is necessary linked with a pattern of values for costs, is easier to explain,

“As time passes, there is income arising to the unit holding the products as the discount factor unwinds”. This sentence could lead to understand that a separate income, such as a kind of interest, has to be recorded. In fact, the unwinding of the discount factor enters the output when it occurs, in a similar way as the maturation of wine. However, it is true that recordings may be complex, in particular when realisations differ from expectations. It is a good practical exercise.

Goods with seasonal patterns of supply and demand

It may be careful to say, as a preliminary, that this method, that is theoretically right, should be used, although seldom used in practice. It is likely that, in price statistics, all changes in prices for cereals are treated as price effect, or that national accountants use prices reported in various statistics without adjustment. To departure from this statistics is not frequent. However, this should be checked with the countries that have the most sophisticated observation statistical system.

§ 6.A16: the rationale that is presented here is not relevant. The choice of treatment - holding gain vs output - does not depend of the behaviour of the producer: why speculative reasons would lead to record holding gain, while incentives stemming from predictable price increases would lead to record output ?

The only reason is that the change that is observed in the value of the concerned product is analysed as a change in its quality. Reference should be made here to the chapter on price and volume measures: this is made in SNA93 §§ 16.105-16.117, that are likely to be reproduced in SNA08. This is also explained in SNA93 § 6.108.

§ 6.A18: what is exposed here is a simplified version of the full version that is exposed in § 6.A17, in a context of reduced information. However, the method should not basically differ from the method used when a full information is available. “ ... past experience and judgement informed by the ratio of prices throughout the year ...” are a simplified version of seasonal coefficients.

There seems to be no reason³ for eliminating first neutral holding gains by the use of a general price index:

- in general, all changes that are analysed to be due to price effects, that is values that do not fit the accepted pre-determined pattern, have to be neutralised under nominal holding gains when estimating output: there is no specificity of the general prices movements;
- in the complete method, there is no need of the knowledge of the relative prices - the specific price of the good vs the general prices - and of the distinction between neutral and real holding gains: why would this change in a simplified version ?
- what is likely to be made is to apply a pre-determined price-schedule, estimated in constant prices, to the actual observed prices of the good;

Then, it is true that the differences between observed and expected prices are treated as nominal holding gains, as in the complete method. This is however the conclusion of § 6A.18: after having eliminated neutral holding gains in a first step, the elimination of real holding gains in a second step is equivalent to the elimination of nominal holding gains. However, the detour through neutral holding gains seems superfluous.

3. Once again, it is not impossible that the author of the present note has not understood anything. However, it would be useful to explain why neutral holding gains have to be eliminated.

Examples

In general, the examples should be more worked out and finalised, including perhaps the national accounts recordings.

Example 1: the example should be better specified:

- A expects a rise of value in period 2: that is good for him ! however, there is no conclusion to draw from that for the national accounts treatment. If there is no seasonal pattern of demand, all the increase in value leads to record holding gains, in period 1 and period 2 as well;
- assuming that we are in the case of point 3 - Goods with seasonal patterns of supply and demand - the treatment to be applied depends completely of the pattern of movements;
- if 108 is conform to the pattern, that is to the expected price, an output of 8 has actually to be recorded;
- if 108 does not fit the pattern, which supposes that observable prices are available, the difference has to be treated as holding gain or loss;
- when there is demand for the good only once in the period, for instance only in the middle of period 2, the increase in the value of inventories due to output is necessarily conventional, since there are no observable prices except at time of sale. In this case, the example is less relevant.

6A.23: "acquisition of inventories" might be changed into "additions to inventories" (see section D).

Example 2: that's right taking account of remarks made about example 1.

Example 3: it is not fair for the reader to go so fast.

The expression "increase in inventories" should be avoided here. Increase may indeed correspond either to holding gain or to production. As production is involved here, the right term is rather "additions to inventories".

E. Other wording issues

Title should be changed into "Separating output due to storage from holding gains and losses"

6A.1 "the increase in value of goods held in inventories may be regarded as production" may be regarded as output
 "as due to production ~~or income~~": the reference to income may be misleading

Title of section 1: Normal storage costs

This title is strange. What are normal costs ? What could be abnormal costs ? To what extent type II goods would constitute non normal costs ? What is the meaning of "costs" here ?

6A.2 Why all these developments about costs incurred in storage ? If it is deemed to prove that storage is part of the activity of production, this is not necessary. Refer to SNA93 §§ 6.64 and 6.104.
 It may be useful nevertheless, but not at the beginning.

6A.9 "there is ~~final~~ demand for the product": it is not necessary for the demand to be final.

6A.9 ~~"As with type I products, there will be some intermediate and other costs associated with storage, so the value added from storage will be less than the full value of storage output, but this is the normal way a production account is formulated."~~
 This is useless here, and inflate the paragraph. In addition, maturation is a typical case where the output is not output of storage, but output of the good in storage.

6A.10 inappropriate use of "production of storage".